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(54) Sawing and milling tool.

(57) The invention relates to a sawing and milling tool (1) for working primarily soft material, for instance wood. The tool includes a saw chain (20) composed of a plurality of links (21-23). The tool (1) includes a centre disc (10) of circular outer configuration. The saw chain (20) extends around the periphery of the centre disc (10) and a clearance or play is presented between the chain and the disc, such that the chain can be rotated relative to the disc when the disc is stationary. The chain links (21-23) have mutually different shapes and/or weights, such that when acted upon by centrifugal forces generated by rotation of the tool (1) the play or clearance is eliminated partially, so that the chain (20) is caused to accompany the centre disc in its rotation, as a result of frictional engagement between at least one chain link and the centre disc. The peripheral surface (12) of the centre disc (10) has formed therein a circumferentially extending guide groove (13) and the saw chain (20) includes guide links (23) which extend into the groove (13). Formed in the centre part of the disc (10) is a hole (11) by means of which the tool (1) can be mounted on a rotatable spindle of, for instance, a hand-held machine. The inventive tool can be used as a saw blade and milling blade when working, for instance, wooden workpieces. In principle, it is not necessary to lubricate the tool, despite the presence of the saw chain. The tool also incorporates a slip-guard, which is activated automatically when the saw chain becomes jammed or when an excessively high feed-pressure is applied when using the tool.

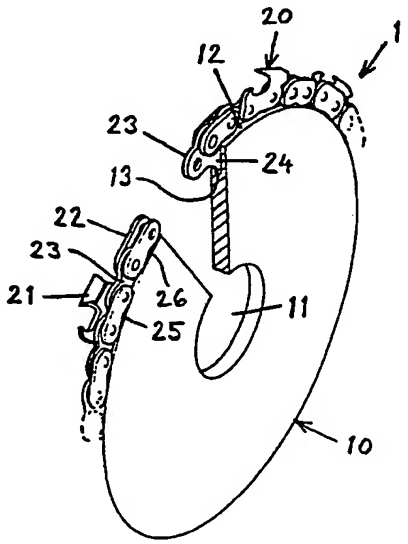

FIG. 3

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A SAWING AND MILLING TOOL

The present invention relates to a sawing and milling tool according to the preamble of Claim 1.

So-called motor saws are normally fitted with an elongated guide or chain bar, around which a saw chain composed of a plurality of chain links is intended to. run. A constant supply of lubricant is required, in order for the saw chain to move smoothly in relation to the guide bar. Unfortunately, motor saws are relatively heavy and clumsy machines and consequently the use of such saws within the building and carpentry industry is relatively restricted, despite the fact that the saw chain can be used effectively to carry-out both sawing and milling operations.

The object of the present invention is to provide a tool which is provided with a saw chain and which can be used effectively to work primarily soft materials, such as wood for instance. This object is achieved with a tool which has the characteristic features set forth in the following claims.

The inventive tool can be used both as a saw and as a milling tool, when working wooden workpieces for example, i.e. the tool is operative to perform both sawing and milling operations. This latter attribute enables the inventive tool to be used to carry-out effectively wood-carving operations and other wood-working operations in which it is desired to remove material in similar operations, such as milling and sawing. The inventive tool finds particular use in the building and carpentry industries. The tool can be fitted to many different kinds of so-called hand-held machines, in the form of machines which can be operated with one hand or with two hands and which are provided with a rotatable spindle, such as angle grinders, bevelling machines, circular grinders, hand drills and like machines. This enables the inventive tool to be carried by readily-handled, lightweight machines, therewith rendering the tool highly useful in many different cases. It will be understood that the tool can also be fitted to stationary machines.

One of the further advantages afforded by the inventive tool is that in principle lubrication of the tool is unnecessary. The tool also incorporates a slip or skid guard which is activated automatically should the saw-chain become jammed in use or when the tool is fed into the workpiece at excessively high speeds.

An exemplifying embodiment of the invention will now be described in more detail with reference to the accompanying drawings, in which

Fig. 1 is a perspective view of the inventive tool fitted to a hand-held machine;

Fig. 2 is a perspective view of the inventive tool per se;

Fig. 3 is a partially section view of the tool and shows an interruption in the saw chain;

Fig. 4 illustrates the tool schematically and in side view; and

Fig. 5 is a perspective view of another embodiment of the inventive tool.

As illustrated in Fig. 1, the inventive tool 1 can be fitted to any type of so-called hand-held machine 2, the tool 1 being firmly mounted onto the rotatable spindle of the machine 2, so as to be driven for rotation by said machine. As illustrated in Fig. 1 the machine 2 includes a guard 3 which is mounted in the vicinity of the rotating tool 1 on the machine 2, such as to protect the workman using the tool.

The tool 1 includes a centre, circular disc 10. Provided in the centre of the disc 10 is a hole 11 by means of which the tool 1 can be fitted to the machine 2 concerned. The hole 11 may be replaced with a pin or some other suitable device which will enable the tool to be fitted to a given machine. A guide groove 13 is provided in the peripheral surface 12 of the circular disc 10.

The tool 1 also includes a so-called saw chain 20, the construction and configuration of which coincides essentially with the construction and configuration of a conventional saw chain of a motor saw. The saw chain 20 includes, for example, a plurality of sharp-edged cutting links 21, a plurality of intermediate links 22 and a plurality of guide links 23. The guide links 23 include a guide-part 24 which projects into the guide groove 13 on the disc 10, wherewith the saw chain 20 is guided relative to the centre disc 10 by coaction between the guide links 23 and the guide groove 13. The shape and dimension of the guide groove 13 are thus adapted to the shape and dimension of the guide-part 24, such as to obtain a certain amount of play or clearance. The length of the saw chain 20 is appropriately adapted so as to obtain a given clearance or a given amount of play between the undersurfaces 25 and 26 of respective links 21 and 22 and the peripheral surface 12 of the disc 10. The size of the aforesaid play or clearance is preferably such as to enable the saw chain 20 to be moved manually in relation to the disc 10 when said disc is stationary, such that the undersurfaces of the links 21 and 22 will slide along the peripheral surface 12 of the disc with the guide links 23 sliding in the groove 13.

The saw chain 20 is fitted to the disc 10, by connecting the ends of the chain together with the aid of a chain-locking link or by joining the chain in a conventional manner.

The inventive tool operates in the following

manner. The following takes place when the tool 1 is fitted, for instance, to a hand-held machine 2 and is caused to rotate by said machine. As a result of the varying configurations and weights of the chain links 21-23, the chain links are acted upon by centrifugal forces of mutually different values as the tool 1 rotates, causing the chain 20 to pinch firmly onto the centre disc 10 and accompany said disc during its rotation, as a result of the frictional effect induced so to speak. The saw chain 20 will thus accompany the rotating disc 10 automatically, said tool 1 functioning as a saw and milling disc when working a soft material, for instance wood. When the tool 1 is used to carry out a milling function, the tool is moved at least partially in a sideways direction, the cutting depths therewith being restricted substantially by the depths or lengths of the cutting edge of the saw links.

It will be understood that in principle there is no need to supply lubricant to the tool 1, between the centre disc and the saw chain, since there is no relative movement, or only insignificant relative movement, between the disc 10 and the chain 20 in normal operation.

The frictional engagement between the saw chain 20 and the centre disc 10 decreases or ceases when the saw chain is subjected to a sawing or milling resistance above a given value, since the links 21-23 of the saw chain 20 are then forced to adopt a position different to the position in which the links are pressed against the disc by the centrifugal forces generated as the tool 1 rotates, thereby causing the frictional engagement between the saw chain 20 and the centre disc 10 to decrease or cease altogether. Thus, the tool I can be given desired characteristics with regard to suitable threshold values at which the frictional engagement between the saw chain and the centre disc is reduced or caused to cease, by selecting a given clearance or play between the saw chain 20 and the centre disc 10. In other words, slipping between the saw chain 20 and the centre disc 10 can be caused to take place automatically at mutually different loads on the saw chain, by varying the play or clearance between the saw chain and the centre disc.

The characteristics of the automatic dogging of the saw chain 20 by the centre disc 10 can be varied by, for instance, varying the configuration, weight and dimensions of the respective chain links 21-23.

The frictional engagement by means of which the saw chain 20 is dogged by the centre disc 10 is caused by the fact that certain link-parts are urged by the centrifugal forces generated into abutment with the peripheral surface 10 of the centre disc or with a surface in the guide groove 13.

The embodiment of the inventive tool illustrated in Fig. 5 differs from the aforedescribed embodiment insomuch that the saw links 21′ are configured so that their cutting edges 27′ also extend radially inwardly of the periphery of the centre disc 10′. It will be understood from this that the saw links can be configured so as to increase the length of the cutting edges, therewith enabling workpieces to be milled to a greater depth, by permitting the cutting edge to extend. in towards the centre of the dis 10′.

It will also be understood that the saw chain 20 can be guided in relation to the centre disc 10 in a number of different ways, additional to that illustrated and described. For instance, the guide links 23 can be disposed so as to obtain guiding action on both side surfaces of the disc 10.

Consequently, the invention is not restricted to the illustrated and described embodiments, since these embodiments can be modified and changed within the scope of the following claims.

Claims

1. A sawing and milling tool (1) for working primarily soft materials, for instance wood, said tool including a saw chain (20) composed of a plurality of links (21-23), **characterized** in that the tool (1) includes a centre disc (10) of circular outer configuration; in that the saw chain (20) extends around the periphery of the centre disc; in that there is provided between the saw chain (20) and the centre disc (10) a degree of clearance or play which enables the saw chain to be rotated relative to the disc when the disc is stationary; and in that the chain links (21-23) have mutually different shapes and/or weights such that said clearance or play will be eliminated partially by the centrifugal forces acting thereon when the tool (1) rotates, whereby the saw chain (20) is caused to accompany the disc as it rotates as a result of frictional engagement between at least one chain link and the centre disc.

2. A tool according to Claim 1, **characterized** in that the centre disc (10) has a guide groove (13) around the outer peripheral surface (12) thereof.

3. A tool according to Claim 2, **characterized** in that the saw chain (20) includes guide links (23) which extend into the guide groove (13).

4. A tool according to any one of Claims 1-3, **characterized** in that the centre disc (10) has provided in the centre part thereof a hole (11) or a device which enables the tool (1) to be mounted on a rotatable spindle of, for instance, a hand-held machine (2).

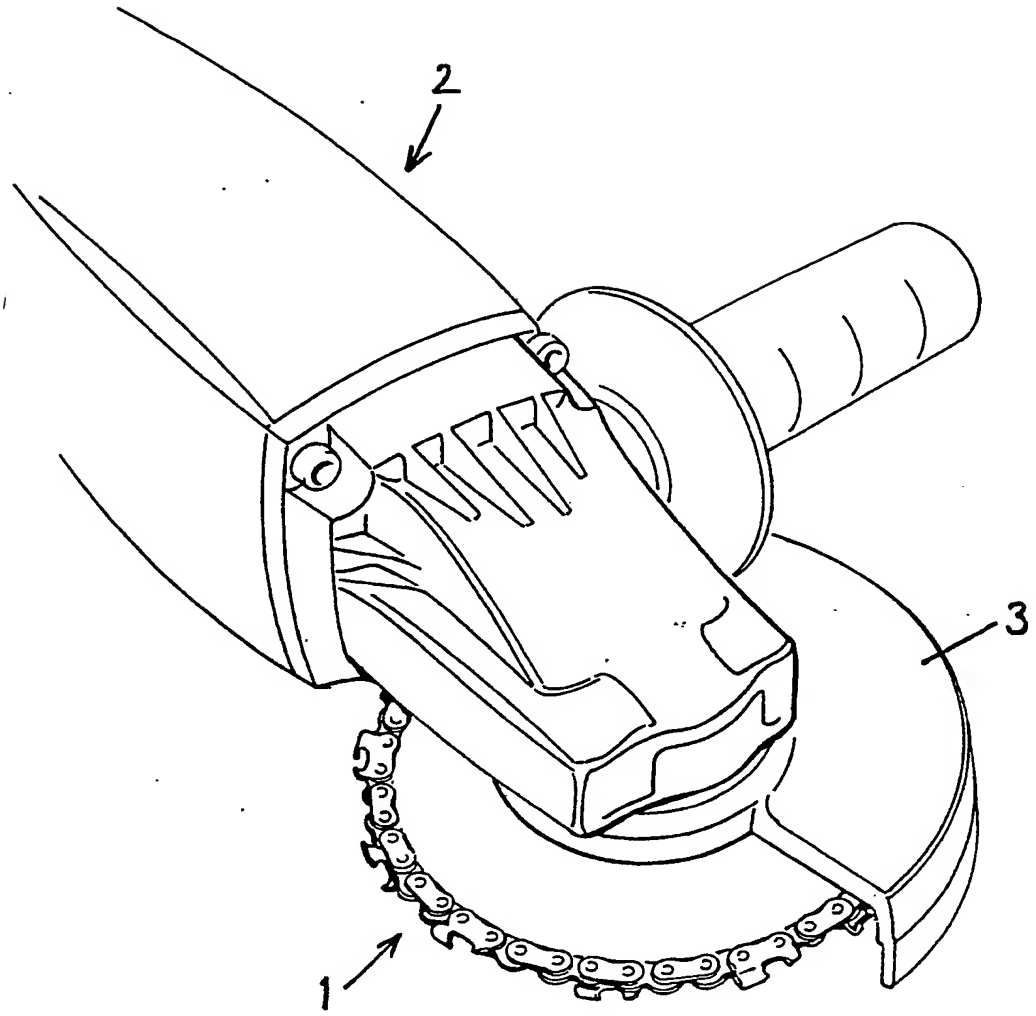

FIG. 1

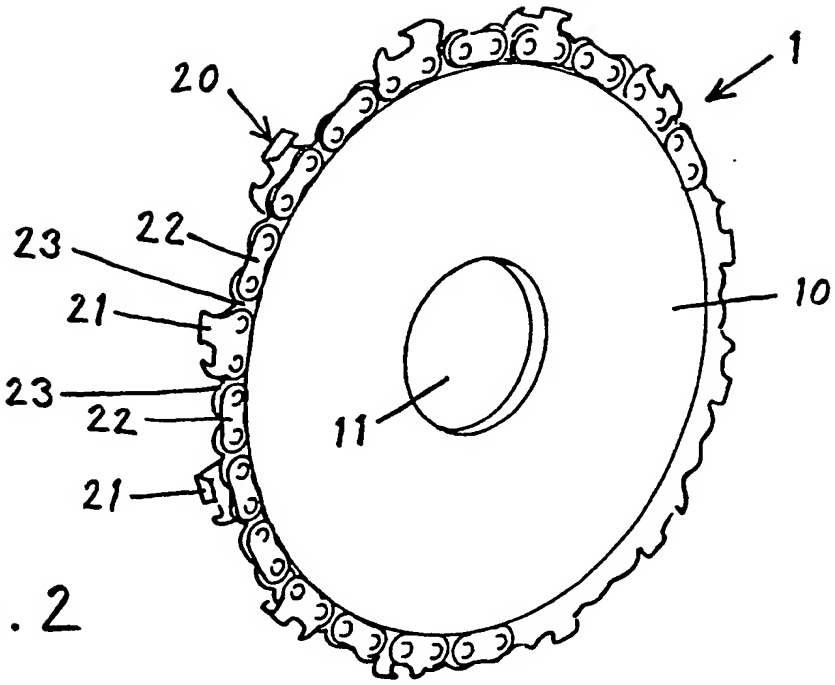

FIG. 2

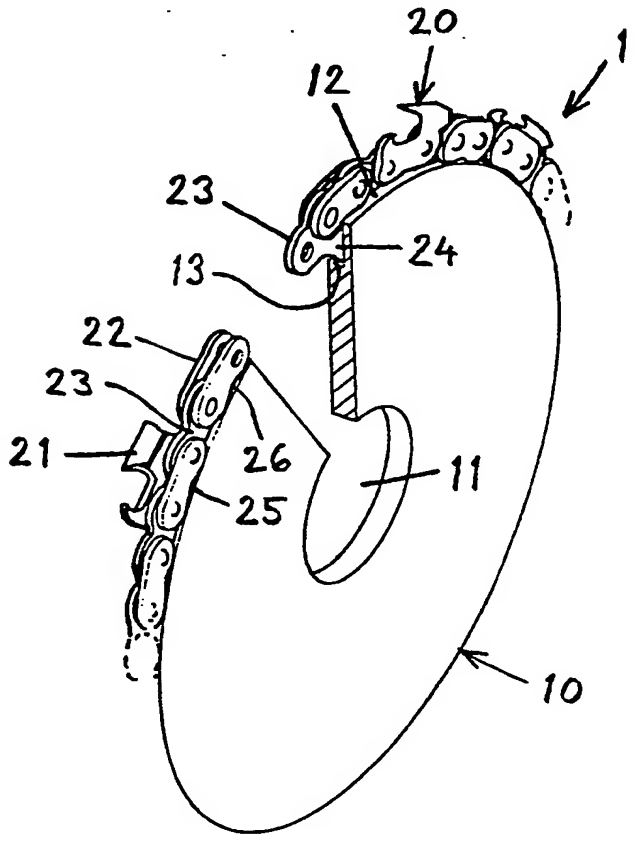

FIG. 3

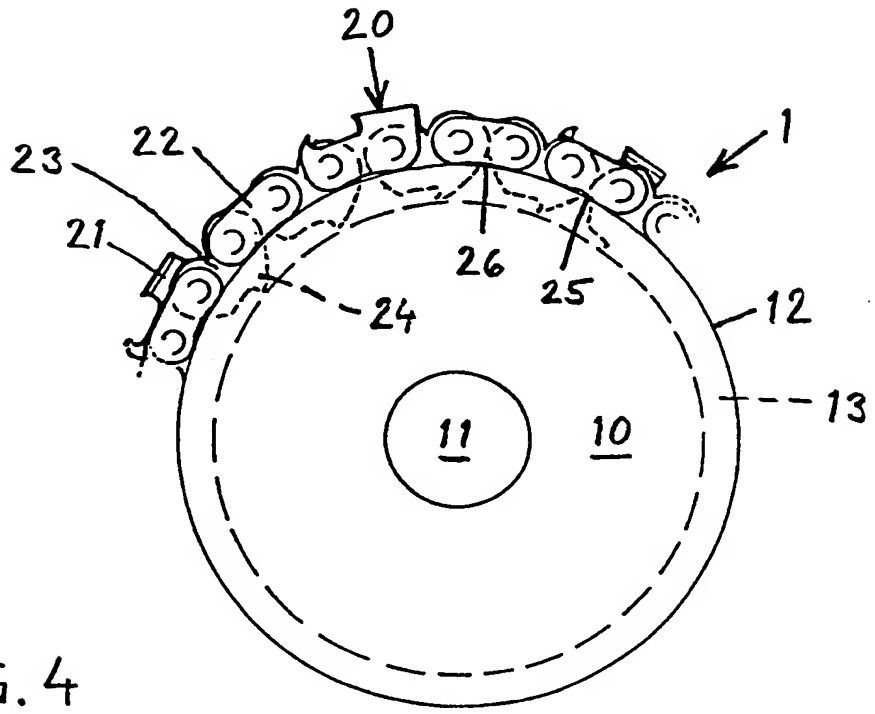

FIG. 4

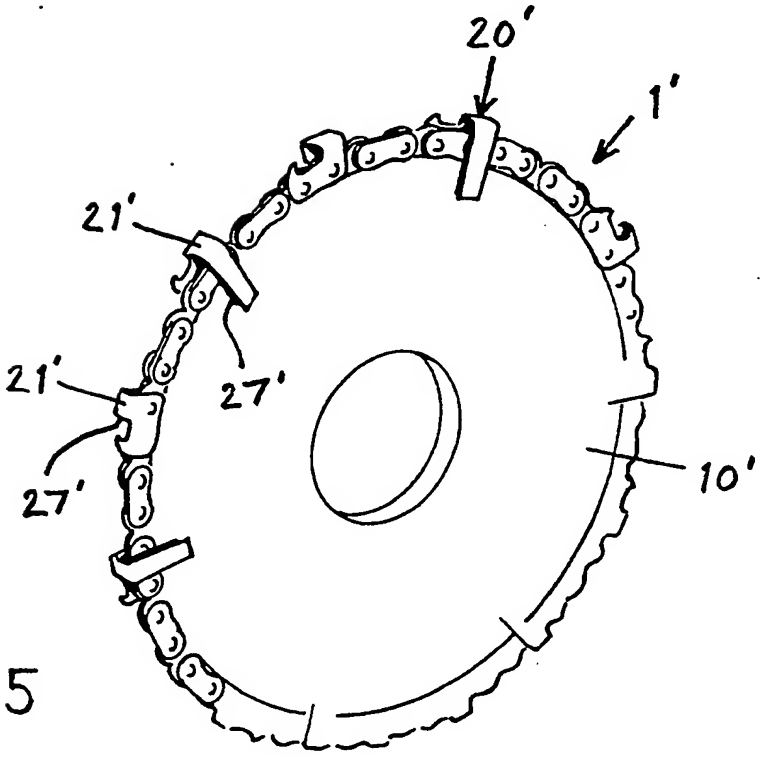

FIG. 5